

Delaware and Raritan Canal:  
Ten Mile Run Culvert  
Under Delaware and Raritan Canal  
1.5 miles south of Blackwells Mills  
Road  
East Millstone Vicinity  
Somerset County  
New Jersey

HAER No. NJ-68

HAER  
NJ,  
18-MILE.V,  
2-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD  
DELAWARE & RARITAN CANAL:  
TEN MILE RUN CULVERT

HAER  
NJ,  
18-MILE-V,  
2-

HAER No. NJ-68

Location: Extending beneath the Delaware & Raritan Canal 1.5 mile south of Blackwells Mills Rd., East Millstone Vicinity, Somerset County, New Jersey  
UTM: 18.534860.4478420  
Quad: Monmouth Junction, New Jersey

Date of Construction: circa 1834; rehabilitation, 1986

Engineer: uncertain

Present Owner: N. J. Dept. of Environmental Protection  
Division of Parks and Forestry, CN 402  
Trenton, N.J. 08625

Present Use: Culvert to carry stream beneath the Delaware & Raritan Canal

Significance: The Ten Mile Run Culvert is an integral part of the Delaware & Raritan Canal's (hereafter D&R Canal) early nineteenth-century engineering design. The culvert's original construction remains largely intact and consists of three 130-foot-long stone masonry barrels that carry Ten Mile Run beneath the canal prism. Built between 1830 and 1834, the D&R Canal is an excellent example of early nineteenth-century American canal technology. In 1973, the D&R Canal, including Ten Mile Run Culvert, was placed on the National Register of Historic Places.

Project Information: This documentation was undertaken by Historic Conservation and Interpretation, Inc. (hereinafter HCI) of Newton, N.J. during May through June of 1986 to record the inlet and outlet headwalls of Ten Mile Run Culvert prior to rehabilitation. The documentation was funded as a voluntary donation by the New Jersey Water Supply Authority, operator of the D&R Canal as a state water supply system.

Brian H. Morrell, HCI, Newton, N.J.

HISTORICAL OVERVIEW OF THE DELAWARE & RARITAN CANAL

The completion of the Delaware & Raritan Canal (hereinafter D&R Canal) across the narrow central "waist" of New Jersey in 1834 was the fruition of a more than one-hundred-year-old dream of creating an inland navigation that would eliminate travel around the extreme southern end of New Jersey for passage between the Hudson and Delaware rivers. Designed by well-known American canal engineer Canvass White and constructed between 1830 and 1834 by Irish immigrant labor, the waterway consisted of a 42-mile-long Main Canal that measured 75 feet wide and 8 feet deep and connected New Brunswick, N.J. on the Raritan River with Bordentown, N.J. on the Delaware River. Designed primarily to exploit the lucrative inter-regional anthracite trade, the canal served as an important navigation link in a network of canals extending eastward from the Pennsylvania coal fields to the New York metropolitan area. The D&R Canal was also a segment in the East Coast's inland waterway system, which provided passage between the northeastern and southeastern regions of the United States.

In 1871, the D&R Canal was leased to the Pennsylvania Railroad Company for 999 years. Competition from new through railroad links and unfavorable toll rates resulted in a continual decline in use of the canal until it was abandoned in 1933. The State of New Jersey assumed ownership of the canal in 1934, and in 1944 began conversion of the waterway to a water supply system. In 1973, the Delaware & Raritan Canal was entered on the National Register of Historic Places; one year later, it became the Delaware & Raritan Canal State Park. Currently, in addition to serving as a water supply system, the canal is one of the state's major historic districts and is a recreational corridor of ever-increasing importance in Central New Jersey.

Description of Ten Mile Run Culvert

Ten Mile Run Culvert is a triple barrel, stone arch culvert that carries the stream Ten Mile Run beneath the Delaware & Raritan Canal in Franklin Township, Somerset County, N.J. Although its date of construction is unknown, the culvert may have been built during the 1830-34 construction of the overall canal. As the design engineer of the D&R Canal, Canvass White, a well-known American canal engineer, may thus have been responsible for the design of Ten Mile Run Culvert.

DELAWARE & RARITAN CANAL:  
TEN MILE RUN CULVERT  
HAER No. NJ-68 (Page 3)

The culvert is approximately 130 feet long, and its three barrels are each 12 feet wide and about 8.5 feet high inside. At the inlet end of the culvert is a vertical drop in the streambed of about 7 feet, which is formed by a masonry wall. Above this spillway wall are the high stone arch barrels of the culvert's inlet headwall.

Known as a drop culvert, due to the vertical spillway at the inlet, this culvert design increased the rate of the stream flow by creating a falls, thereby flushing out the culvert interior to prevent silt buildup. The present-day massive silt accumulation in Ten Mile Run and the Millstone River immediately downstream of the culvert prevents the barrels from being flushed out as per the historic design.

Proceeding into the culvert 12 feet from the inlet headwall are interior stone arch barrels that are 7.5 feet lower than the high barrels at the culvert inlet. The low, interior barrels continue throughout the rest of the length of the culvert. The culvert interior has no floor, but rather rests on solid shale. Both of the culvert headwalls are constructed of locally available shale and sandstone. The exact location where the stones were quarried is unknown.

Beneath the southeast canal bank, above the culvert inlet, is a low stone cutoff wall that rests on the top of the culvert barrels along the edge of the canal bank. A row of vertical heartening planks was attached to a horizontal nailer along the edge of the low cutoff wall. The planking was used to anchor in place the base of the canal bank and also to help prevent leakage through the base of the bank. Similarly, the cutoff wall prevented leakage along the top of the culvert, beneath the canal bank. The top of the culvert beneath the canal bed had plank sheathing on top of it in addition to clay liner.

The Ten Mile Run Culvert outlet headwall had been extended higher than its original elevation at some time in the nineteenth century, as evidenced by the totally different stonework at the top of the wall. Also, at the time of this extension, two stone buttresses were added to support the face of the higher headwall.

Following the permanent closing of the canal for navigation in 1933, the State of New Jersey assumed ownership of the canal and currently operates it as a water supply system. In addition, the waterway provides recreational

DELAWARE & RARITAN CANAL:  
TEN MILE RUN CULVERT  
HAER No. NJ-68 (Page 4)

facilities since it is part of a state park. The Delaware & Raritan Canal is also listed on the National Register of Historic Places.

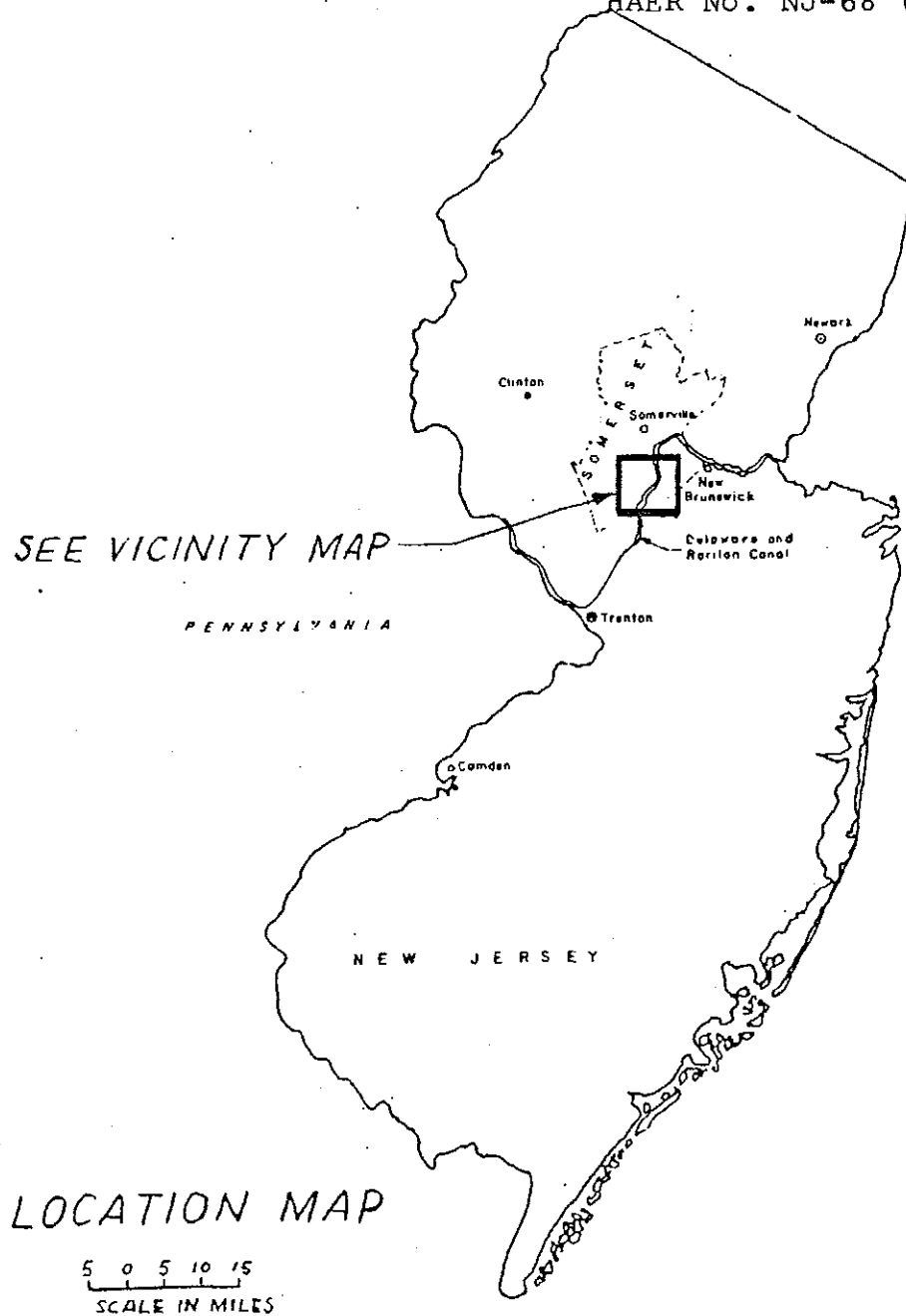
Under state ownership, the maintenance of Ten Mile Run Culvert has been minimal, and it was in deteriorated condition. During the spring through the fall of 1986, a major rehabilitation project was underway at the culvert. As part of this project, the enclosed archival photographs were taken to record the culvert's original construction. When the rehabilitation of the culvert was complete, portions of the original masonry had been removed and replaced with modern construction. The culvert's rehabilitation was part of an on-going maintenance program focusing on many of the canal's historic structures. The rehabilitation of the culvert included the following work at the inlet headwall: the removal of the curved wingwalls and their replacement with concrete walls faced with stone veneer; replacement of scattered deteriorated voussoirs; re-seating of the headwall's coping stones; replacement of the central barrel's vertical transition wall between the high inlet barrel and the low, interior, inlet barrel with concrete faced with stone; and the installation of a concrete jacket on the back of the inlet headwall and on the tops of the inlet's high and low barrels beneath the canal bank.

The work at the culvert outlet headwall included the removal of the deteriorated upper portion of the headwall and its replacement with a concrete wall faced with new stone veneer; rebuilding of the upper portion of the two buttresses at the headwall; and installation of a concrete jacket on top of the outlet barrels. During the rehabilitation process, most of the canal bed on top of the culvert was removed along with the entire southeast bank and part of the northwest bank and replaced with new materials.

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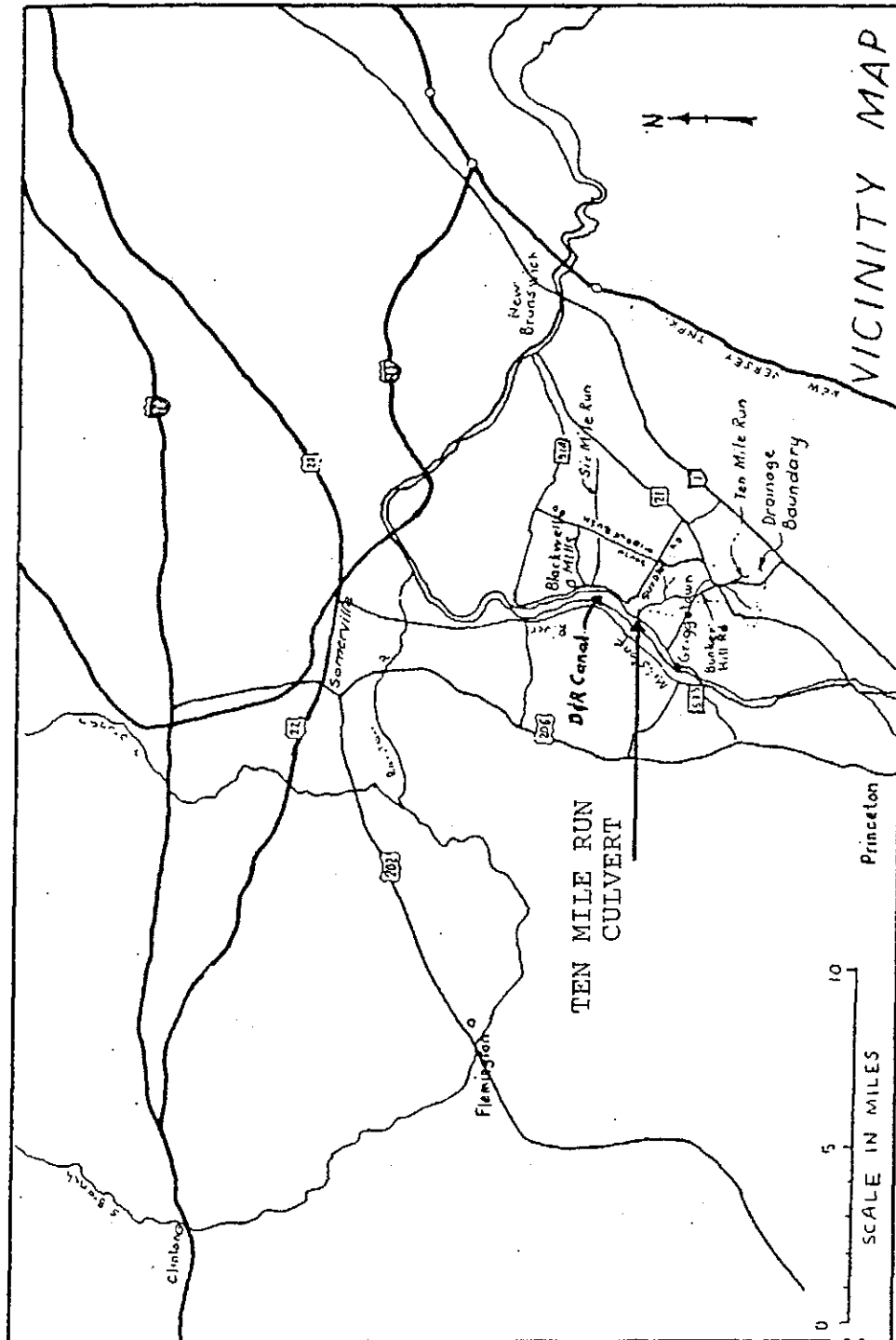
DELAWARE & RARITAN CANAL:  
TEN MILE RUN CULVERT  
HAER No. NJ-68 (Page 6)



Location Map showing site of Ten Mile Run Culvert outlined by a square. Map taken from construction plans entitled: Delaware and Raritan Canal Capital Improvement Program, Rehabilitation Of The Ten Mile Run Culvert-Phase II, Station 2223+50, Franklin Township, Somerset County, June 1985. Prepared by Tippetts-Abbett-McCarthy-Stratton, Engineers, Architects And Planners, Bloomfield, New Jersey.

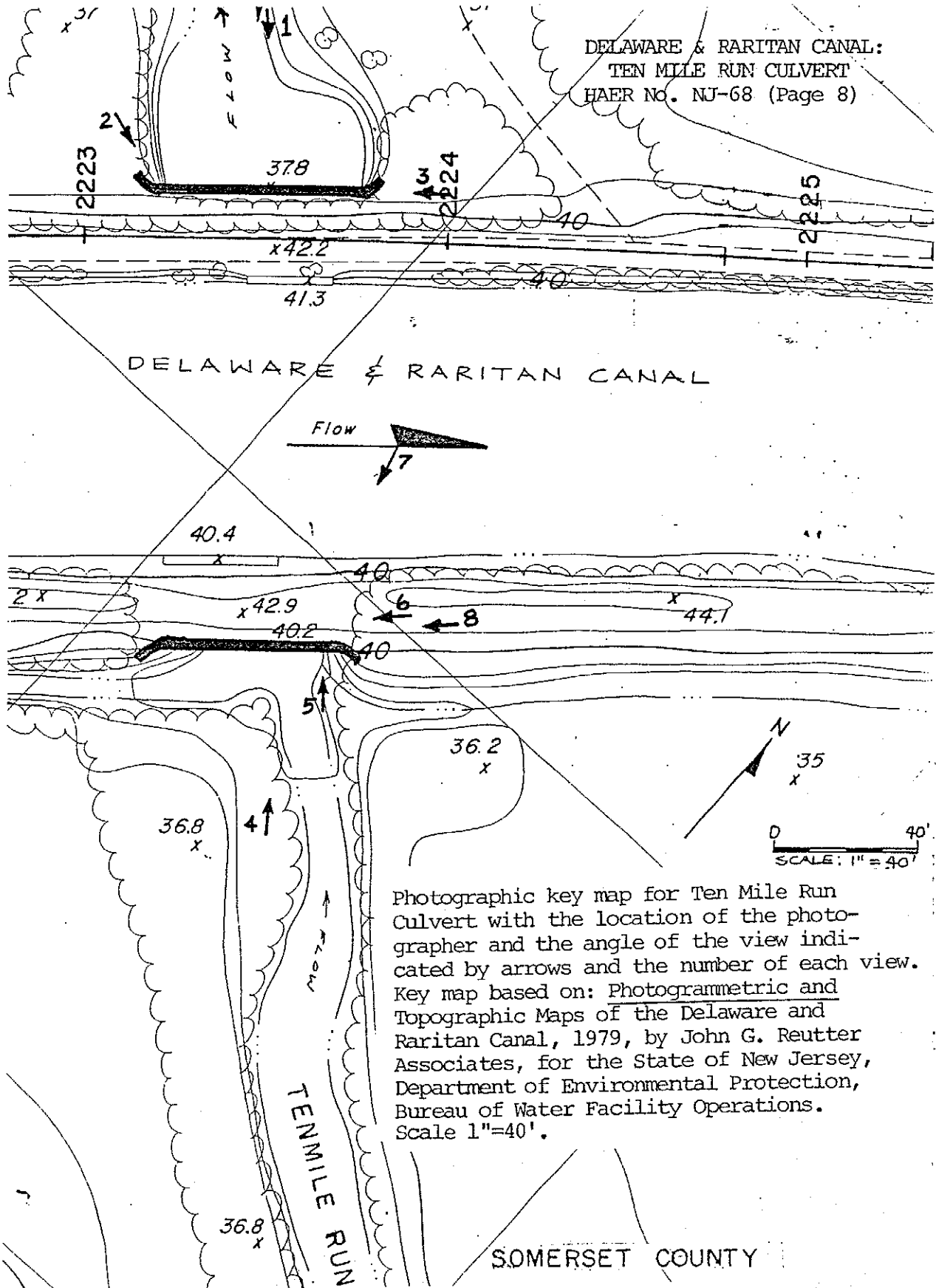
Vicinity Map showing site of Ten Mile Run Culvert. Map taken from construction plans entitled: Delaware and Raritan Canal Capital Improvement Program, Rehabilitation Of The Ten Mile Run Culvert-Phase II, Station 2223+50, Franklin Township, Somerset County, June 1985. Prepared by Tippetts-Abbett-McCarthy-Stratton, Engineers, Architects And Planners, Bloomfield, New Jersey.

DELAWARE & RARITAN CANAL:  
TEN MILE RUN CULVERT  
HAER No. NJ-68 (Page 7)





DELAWARE & RARITAN CANAL:  
TEN MILE RUN CULVERT  
HAER No. NJ-68 (Page 8)



Photographic key map for Ten Mile Run Culvert with the location of the photographer and the angle of the view indicated by arrows and the number of each view. Key map based on: Photogrammetric and Topographic Maps of the Delaware and Raritan Canal, 1979, by John G. Reutter Associates, for the State of New Jersey, Department of Environmental Protection, Bureau of Water Facility Operations. Scale 1"=40'.

SOMERSET COUNTY